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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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June 1970

U.S. Training and
Employment Service
Technical Report
S-71R

Development of USTES

APTITUDE TEST BATTERY FOR

COSMETOLOGIST

(per. ser)
332.271

U.S. DEPARTMENT OF LABOR
Manpower Administration

TM 001 268

Technical Report on Development of USTES Aptitude Test Battery

For . . . .

Cosmetologist (per. ser.) 332.271

S-71R

(Developed in Cooperation with the Idaho and
Minnesota State Employment Services)

U.S. Department of Labor
Manpower Administration

June 1970

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the predic tion of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs wi th content similar to that shown in the job description included in this report.

GATB Study #2061,2023

Development of USTES Aptitude Test Battery

For

Cosmetologist (per. ser.) 332.271-010

S-71R

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Cosmetologist (per. ser.) 332.271-010. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
S - Spatial Aptitude	90
P - Form Perception	80
Q - Clerical Perception	95
M - Manual Dexterity	75

Research Summary

Sample:

99 students enrolled in courses in Cosmetology in Idaho and Minnesota.

This study was conducted prior to the requirement of providing minority group information. Therefore, minority group status is unknown.

Criterion:

Supervisory ratings.

Design:

Concurrent (test and criterion data were collected at approximately the same time for 76 students. Criterion data for the other 23 students were collected about 10 months after testing).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, aptitude-criterion correlations and selective efficiencies.

Concurrent Validity:

Phi coefficient = .32 ($P/2 < .005$) .

Effectiveness of Norms:

Only 68% of the nontest-selected students used for this study were good students; if the students had been test-selected with the above norms, 80% would have been good students. Thirty-two percent of the nontest-selected students used for this study were poor students; if the students had been test-selected with the above norms, only 20% would have been poor students. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Students	68%	80%
Poor Students	32%	20%

SAMPLE DESCRIPTION

Size:

N = 99

Occupational Status:

Students.

Work Setting:

Students were enrolled in Austin High School, Austin, Minnesota, and in the following schools in Idaho:

Name of School	City
State Beauty College	Boise
Ex-Cel-Cis Beauty School	Boise
Ex-Cel-Cis Beauty School	Idaho Falls
Idaho Beauty College	Lewiston
Cameo Beauty School	Lewiston
Peacock Beauty College	Nampa
Superior Western Beauty School	Nampa
Vocational School of Cosmetology	Pocatello

School Selection Requirements:

Education: None required.

Previous Experience: None required.

Tests: None used.

Principal Activities:

The job duties for each worker are comparable to those shown in the job description in the Appendix.

Minimum Experience:

At the time criterion measures were collected, all students had completed at least ten months training in school.

TABLE 2

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for Age and Education.

	Mean	SD	Range	r
Age (years)	22.6	6.9	16-46	.125
Education (years)	11.4	1.0	8-13	.089

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002A were administered during February through July, 1954.

CRITERION

The criterion data for the Idaho sample consisted of instructors' rating. The ratings were obtained by having instructors in each school divide the students into three categories: Above average students, average students and below average students. Rank order ratings were also obtained for each group.

The criterion data for the Minnesota sample consisted of course grades and instructor's rating. The grades criterion was letter grades comprising seven levels of proficiency (A,B, B-,C+,C,C-,and D.) The rating criterion consisted of a combination of three separate ratings High (H), Medium (M), and Low(L) submitted by the instructor who also graded the students.

Since both samples perform similar job duties and were sufficiently similar with respect to age and education the two samples were combined into one total sample on the basis of both statistical and qualitative considerations.

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 32% of the sample in the low group to correspond with the percentage of students considered unsatisfactory or marginal. Students in the high criterion group were designated as "good students" and those in the low group as "poor students."

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitudes K and M which do not have high correlations with the criterion, were considered for inclusion in the norms because the qualitative analysis indicated that the aptitude K might be important for the job duties and the sample had relatively high mean scores on this aptitude. Aptitude M was included since it was considered of critical importance to the job duties. Tables 3,4, and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performance)

Aptitude	Rationale
G - General Learning Ability	Required to understand instructions while learning to perform the various phases of beauty culture work, and to reason and make judgments in assisting patrons to decide which of the various treatments should be applied to fit individual needs.
V - Verbal Aptitude	Necessary for reading comprehension; understanding of notes taken from lecture material; and facility of expression which is needed for greeting patrons ascertaining services desired and in explaining beauty treatments, hair styles and other services.
P - Form Perception	Required to make visual comparisons and discriminations in order to cut and style hair, apply makeup, and perform other duties such as arching eyebrows and shaping nails.
K - Motor Coordination	Required to coordinate eyes, hands, and fingers to cut, style and tint hair, give facials, arch eyebrows and manicure nails.
F - Finger Dexterity	Required to cut hair, using scissors and razor; to curl hair with the aid of small metal or plastic curlers.
M - Manual Dexterity	Required to grasp and manipulate hair or equipment; to massage face and scalp and to clean, polish, and shape nails using manicuring instruments.

TABLE 4

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 99

	Mean	SD	Range	r
G - General Learning Ability	95.1	14.0	67-133	.327**
V - Verbal Aptitude	96.1	14.8	70-139	.242*
N - Numerical Aptitude	92.0	12.9	57-120	.310**
S - Spatial Aptitude	99.6	16.1	61-133	.254*
P - Form Perception	105.9	16.1	67-153	.235*
Q - Clerical Perception	105.5	14.3	72-147	.157
K - Motor Coordination	102.3	16.9	70-159	-.023
F - Finger Dexterity	96.2	18.3	22-139	.079
M - Manual Dexterity	98.3	16.9	61-141	.066

*Significant at the .05 level.
**Significant at the .01 level.

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X			X		X	X	X*
Irrelevant									
Relatively High Mean					X	X	X		
Relatively Low Standard Dev.	X	X	X			X			
Significant Correlation With Criterion	X	X	X	X	X	X			
Aptitudes to be Considered for Trial Norms	G	V	N	S	P	Q	K		M*

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of the degree to which trial norms consisting of various combinations of aptitudes G,V,N,S,P,Q,K and M at trial cutting scores were able to differentiate between the 68% of the sample considered to be good students and the 32% of the sample considered to be poor students. Trial cutting scores at five-point intervals approximately one standard deviation below the mean are tried because this will eliminate about one-third of the sample with three-aptitude norms. For four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about one-third of the sample; for two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about one-third of the sample. The phi coefficient was used as a basis for comparing trial norms. Norms of S-90, P-80, Q-95, and M-75 provided optimum differentiation for the occupation of Cosmetologist (per. ser.) 332.271-010. The validity of these norms is shown in Table 6 and is indicated by a phi coefficient of .32 (statistically significant at the .005 level).

TABLE 6

Concurrent Validity of Test Norms
S-90, P-80, Q-95, and M-75

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	18	49	67
Poor Students	20	12	32
Total	38	61	99

Phi coefficient = .32 Chi square (X^2_y) = 10.2

Significance Level = $P/2 < .005$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study met the requirements for incorporating the occupation studied into OAP-42 which is shown in the 1970 edition of the Manual for the General Aptitude Test Battery. A phi coefficient of .22 is obtained with the OAP-42 norms of S-90, P-85, and M-85.

FACT SHEET

Job Title

Cosmetologist (per.-ser.) 332.271-010

Job Summary

Performs beauty services for customers: cuts and styles hair, using scissors, clippers, razor, and comb. Shampoos, rinses, and dries hair, using hand spray and electric dryer. Curls hair, using curlers and permanent-wave machine. Applies bleach, dye, tint, and special rinses and makes tests to determine if skin is sensitive to dye. Applies make-up and gives facials, scalp treatments, and manicures.

Work Performed

Explains beauty treatments, hair styles, and other services and suggests coiffure according to physical features of customer and current styles; or determines coiffure from instructions of customer. Styles hair by cutting, trimming and tapering, using comb, brush, clippers, scissors, and razors. Shampoos hair and scalp with water, liquid soap, dry powder, or egg; rinses hair with vinegar, water lemon, or prepared rinses. Brushes and combs hair, applies tonic, and massages scalp, using electric vibrator. Pours water or wave solution over customer's head and finger-waves hair. Dries and sets hair, and pins curls in place using electric dryer, hair pins, bobby pins, or clips. Applies wave solution to curls, covers curls with process cap, and removes cap at end of specified time to administer cold-wave permanent. Attaches electric lamp or coil heaters to curling rods or fastens self-heating chemical sachets (pads) to curling rods to administer permanent, using heat method. Treats hair and scalp, using therapeutic lights, mechanical vibrators, and prepared products. Suggests cosmetics for conditions such as dry or oily skin. Applies lotions, creams, and packs to customer's face and neck to soften and lubricate skin. Applies cosmetics, according to type of complexion or instructions of customer. Applies solution to portion of customer's skin to determine if skin is allergic preparatory to applying bleach,dye, or tint to color hair, using cotton pads, brush, or applicator. Cleans, shapes, and polishes fingernails; and arches or tints eyebrows and eyelashes. May give treatments, using ultraviolet or infrared lamps. May give pedicures. May perform related duties such as managing shop, purchasing supplies, supervising personnel, making appointments, selling cosmetics and related merchandise and receiving payments.

Effectivensss of Norms

Only 68% of the nontest-selected students used for this study were good students; if the students had been test-selected with the S-71R norms, 80% would have been good students. Thirty-two percent of the nontest-selected students used for this study were poor students; if these students had been test-selected with the S-71R norms, only 20% would have been poor students.

Applicability of S-71R Norms

The aptitude test battery is applicable to jobs which include a majority of duties described above.

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